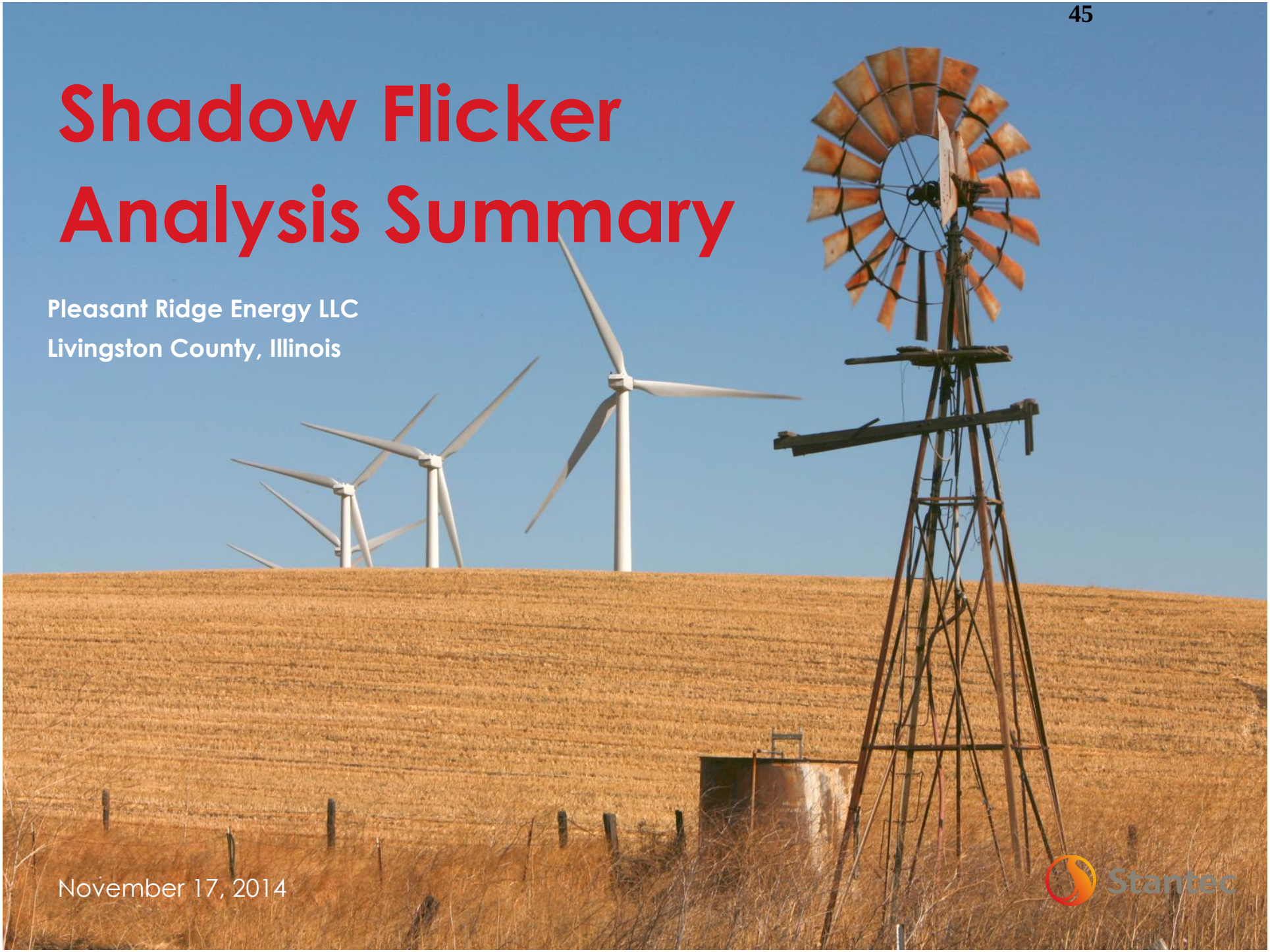
PLEASANT RIDGE EXHIBIT 45

Shadow Flicker Analysis Summary

Pleasant Ridge Energy LLC

Livingston County, Illinois



November 17, 2014

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Personal Qualifications

JoAnne Blank

- Master of Science Atmospheric and Oceanic Sciences
- Master of Science Environmental Monitoring
- 18 years experience in environmental consulting industry
- 10 years experience in wind power industry (over 1,200 megawatts of wind development)
- Wind experience includes: feasibility, facility siting, shadow/flicker analyses, sound analyses, environmental permitting, post construction compliance and more.

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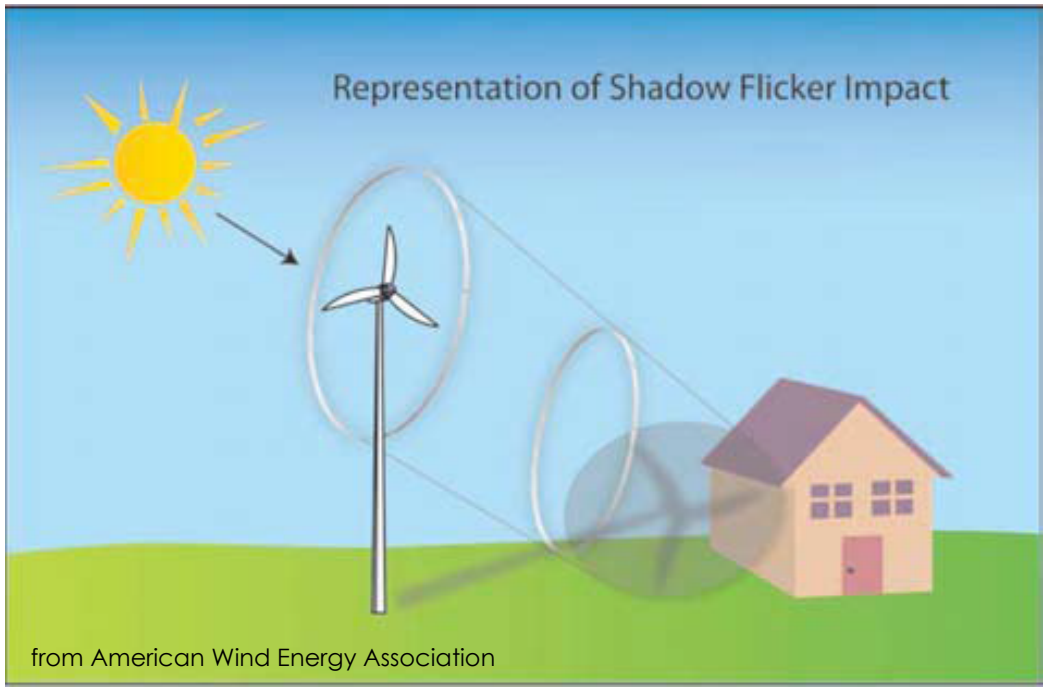
Shadow flicker describes the effect caused by shadows cast by the rotating blades of an operating wind turbine.



Occurs only in direct line between sun – blades – object

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Shadow Flicker

- Only occurs during the daytime when skies are not cloudy or overcast
- Turbines must be operational and blades turning
- Amount depends on alignment of blades to sun and receptor
- Diminishes with distance between turbine and receptor

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Shadow Flicker

- Diminished by vegetation and buildings between turbine and receptor (near)
- Changes as sun progresses during day (limited time on receptor)
- Most noticeable in early morning and late day (sun low in sky)
- Changes with seasons as sun position and angle changes
- Typically lasts about 20 minutes

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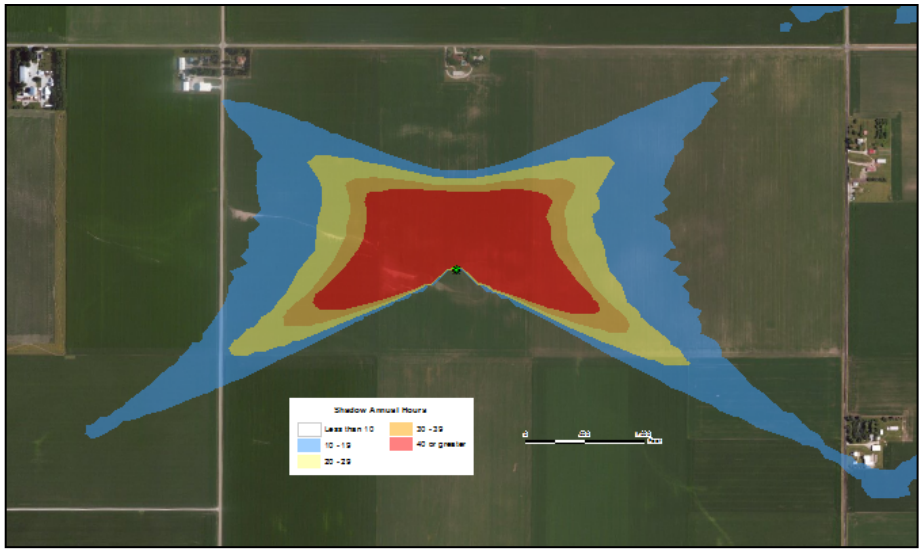
Analysis Methods

- Models were performed in WindPRO, software that progresses through year in one-minute increments



- Calculated hours of expected shadow per year (takes wind speed, direction and hours of sunshine into consideration)
- Calculated maximum shadow hours per day
- Considered residences, parks, churches, schools
- No vegetation or blocking effects were included

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Results of Study

- Approximately 775 residences and other receptors were included in study
- Shadow flicker under 30 hours per year is generally considered an acceptable level
- Results of study indicate that:
  - No residences are expected to receive greater than 30 hours of shadow per year
  - Nine residences – 20 to 30 hours per year
  - 47 residences – 10 to 20 hours per year
  - Most residences – 0 to 10 hours per year

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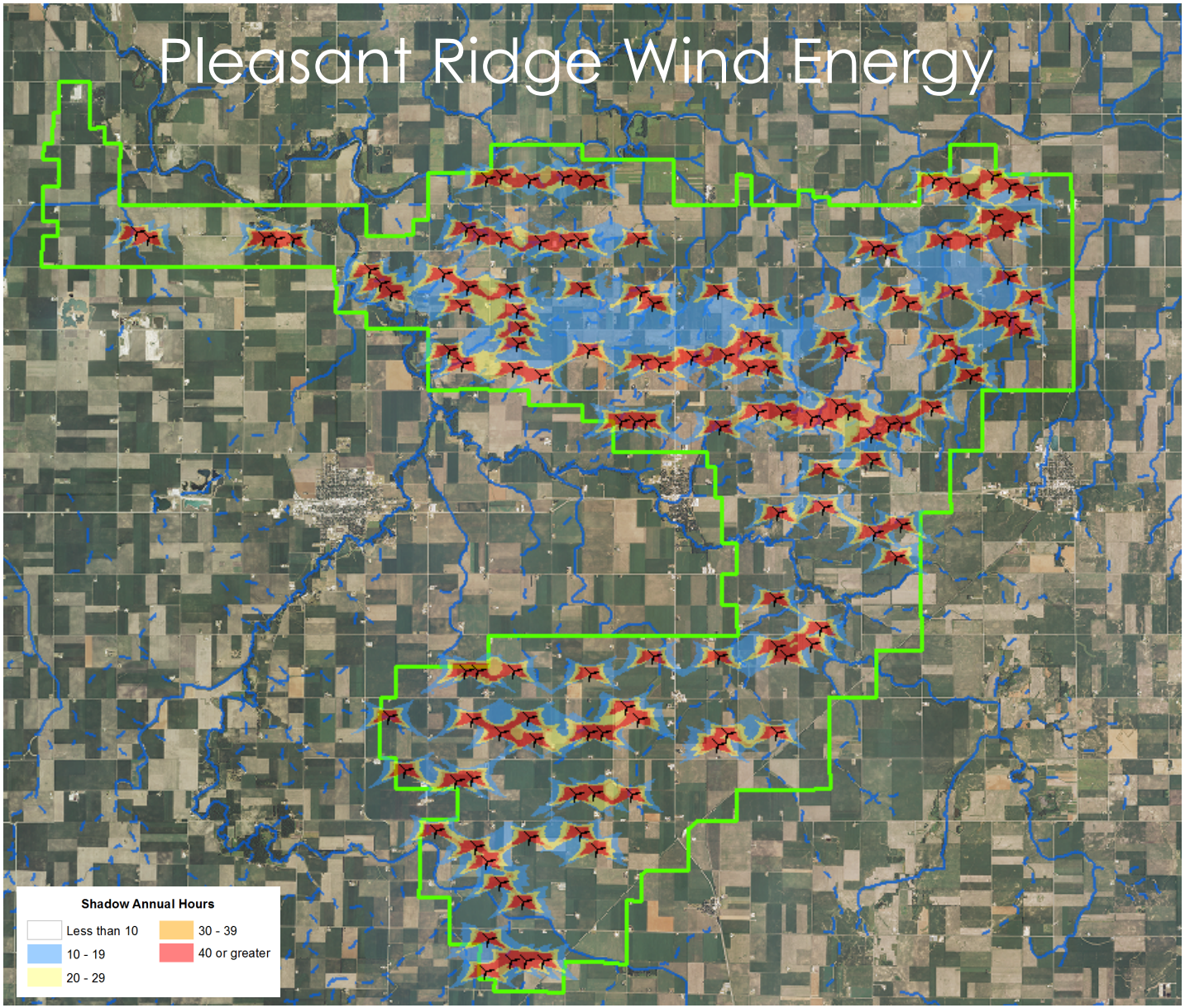
Pleasant Ridge Wind Energy



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99%
Of residences within two miles of a Pleasant Ridge wind turbine are expected to receive less than 20 hours of shadow flicker per year.

Land Use Compatibility Study

Livingston County's Comprehensive Plan stresses the importance of agriculture and the expectation that it will "continue to play both vitally important economic and cultural roles".

Wind energy facilities help to preserve agricultural land use by providing a stable revenue stream to the community and farmers.

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Livingston County Land Use Planning Goals

- Agricultural Land
- Residential
- Commercial and Industrial
- Transportation
- Utilities

- Open Space and Recreation
- Environment and Natural Resource

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Agricultural Land Use Dominates the Project Area